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PHOTOGRAPHIC
INTERPRETATION
REPORT

NATIONAL PHOTOGRAPHIC
INTERPRETATION CENTER

CHANGES AT SARY-SHAGAN RESEARCH AND DEVELOPMENT RADAR FACILITIES 1 AND 2

[redacted]

25X1

MISSILE RANGES--SAM/AMM FACILITIES
USSR
MARCH 1971

[redacted]

25X1

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25X1

MARCH 1971
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ABSTRACT

1. Significant changes at the antenna areas of Research and Development (R&D) Radar Facilities 1 and 2 at the Sary-Shagan Missile Test Center, USSR, are described in this report. At R&D Radar Facility 1 a section of the inclined array at the BIG SCREEN antenna has been modified. Modifications or additions have been made to existing antennas in all three antenna areas at R&D Radar Facility 2. A new facility under construction north of R&D Radar Facility 2 appears to be a water treatment facility possibly intended to serve the research and development facilities.

2. In addition to the textual description of the construction that has been observed at these facilities from August 1968 to November 1970, a map, photograph, and several line drawings are included.

INTRODUCTION

3. Sary-Shagan R&D Radar Facilities 1 and 2 are located on the western shore of Lake Balkhash, 2 nautical miles south of the main housing area (Figure 1). Large linear antennas are boresighted towards incoming warheads from Kapustin Yar. They have performed a major role in the development of large phased-array radars in the USSR. They probably will have a continuing role in further development of the Soviet ABM system.

4. The BIG SCREEN antenna at R&D Radar Facility 1 was constructed in the 1960-63 time frame (Figure 2). No external change to the basic structure was identified until the inclined array was modified between August and November 1969. A large building was observed under construction to the rear of the BIG SCREEN antenna in August 1970. New trenches and excavations were also present.

5. Construction of both large linear arrays at R&D Radar Facility 2, designated TOP ROOST, began in mid-1966 immediately following the dismantling of the old HEN ROOST arrays (Figure 3). The additions or modifications to both TOP ROOST arrays during 1970 could be the final stages of construction or modifications following an initial test period.

6. At the southernmost antenna area at R&D Radar Facility 2, two horizontal arrays were first observed under construction in 1967-68. At the easternmost array, which probably has been operational since 1968, the elements have been arranged in at least two different patterns. The second array did not appear to be operational until April 1970.

BASIC DESCRIPTION

R&D Radar Facility 1

7. The primary components of the BIG SCREEN antenna are an inclined array and a horizontal deck on which the inclined array is positioned.[1] The inclined array has a boresight [ ] Initially, two [ ] sections, also with a [ ] boresight elevation angle, were separated from the northern end of the inclined array and from each other [ ] gaps (see inset, Figure 2). Between August and November 1969, these two narrow sections were modified to form one section [ ] It was separated from the main section of the inclined array by [ ] As were the two previous narrow sections, it appeared to be formed of the same materials, equally as thick (approximately 1 meter, or 3 feet) as the main section of the inclined array.

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8. In August 1970 the foundation for a new building was first observed immediately to the rear of the BIG SCREEN antenna. By October 1970 wall construction was underway on a building 30 meters (99 feet) long [ ] A new trench extended from the rear of this building to a point near the southern security fence. [ ] two small structures were under construction in shallow excavations adjacent to this trench (Figure 2).

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9. Between July and October 1970, a one-story building was constructed contiguous to the northern side of the long control building.

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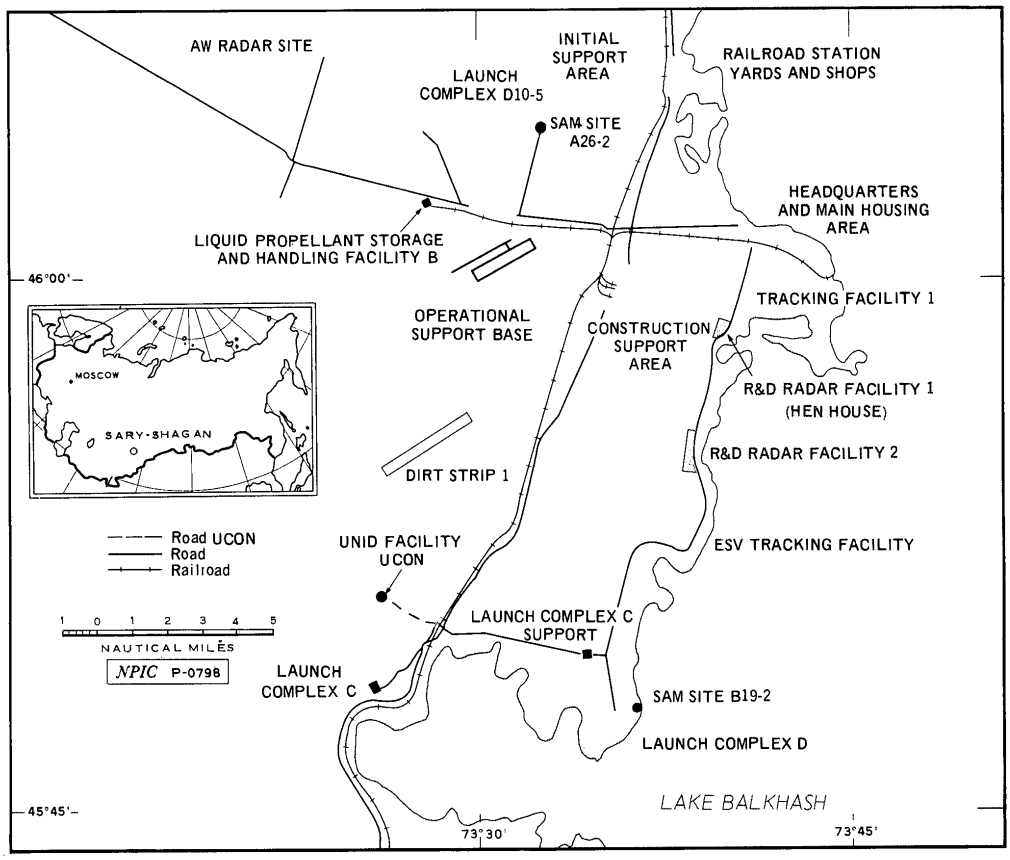


FIGURE 1. RANGEHEAD, SARY-SHAGAN MISSILE TEST CENTER, USSR

R&D Radar Facility 2

10. Construction on two planar arrays (TOP ROOST) began in mid-1966, one at the northern antenna R&D area and one at the central antenna R&D area.[2,3] Construction has progressed on these two antennas at a relatively constant rate. At the southern antenna R&D area, activity since 1968 has been concentrated around two experimental horizontal arrays, where various patterns of similar elements have been observed (Figure 3).

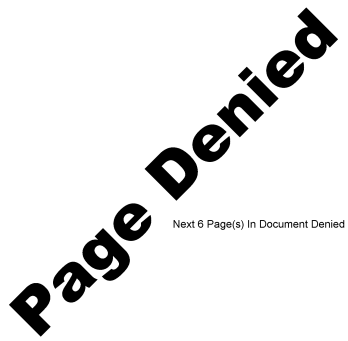
Northern Antenna R&D Area:

11. By April 1970 the [redacted] array attached to the front side of the high-bay section of the planar array had been completely covered by panels similar in appearance to the main antenna surface. By October 1970 a rectangular inclined structure had been attached to the rear of the high-bay section. This structure extended the full slant height of the framework and partially enclosed the two [redacted] arrays that were attached one above the other on the rear of the high-bay structure (Figure 4, inset). 25X1 25X1 25X1

12. Between August and October 1970 a dark-toned band of material [redacted] had been applied along the bottom of the southern section of the planar array fence. A narrow dark-toned band [redacted] had also been applied up the center of the southern section of the array (Figure 4). 25X1 25X1 25X1

Central Antenna R&D Area:

13. [redacted] the framework structure connecting the antenna array with the control building had been enclosed. This structure has a vertical rear wall and a sloping face located 3 meters (10 feet) forward of and parallel to the main array face. This sloping face may be a separate antenna section (Figure 5). 25X1



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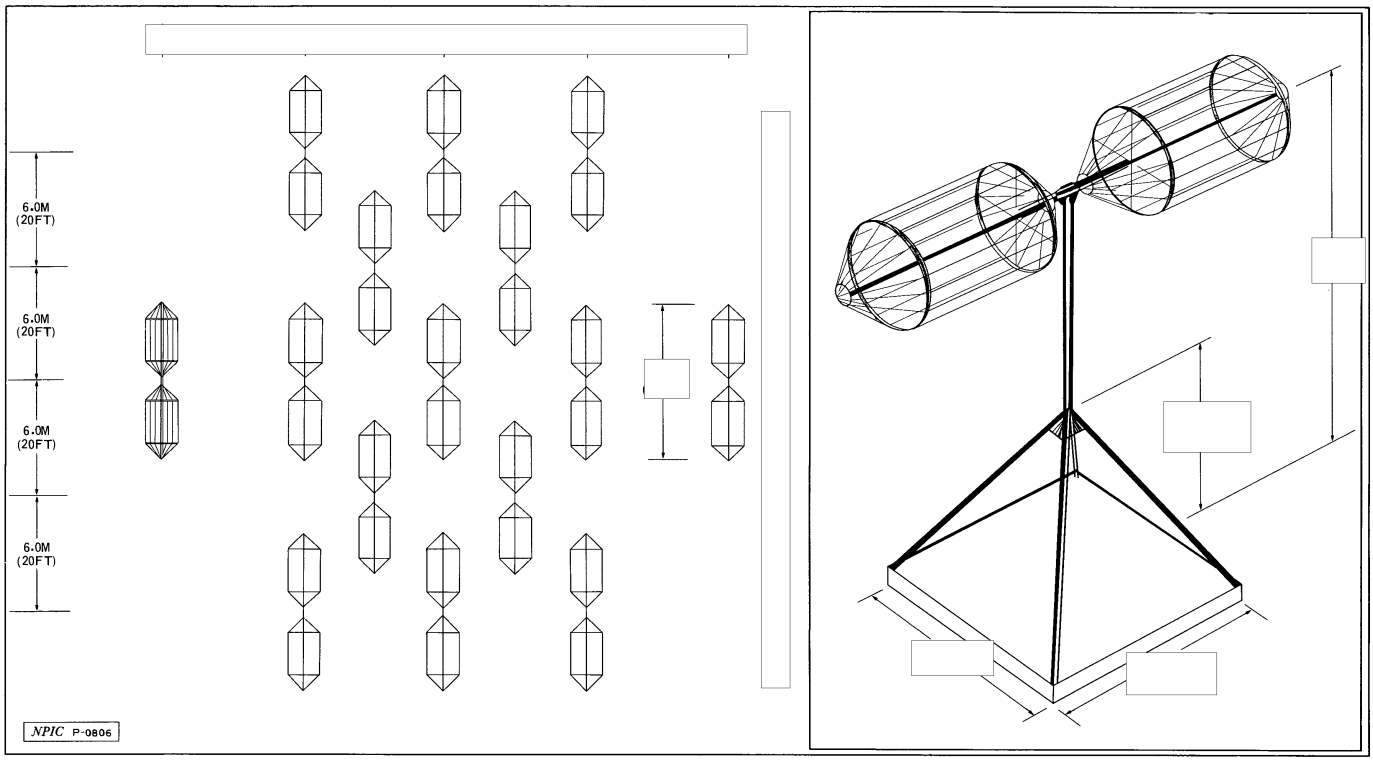

FIGURE 9. ARTIST'S CONCEPT OF CAGE DIPOLE ANTENNAS AT SOUTHERN ANTENNA R&D AREA B

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Southern Antenna R&D Area:

14. Since late 1967 two horizontal antenna arrays have been constructed in area B of the southern antenna R&D area. The first array completed consisted of 25 individually mounted, thin, horizontal elements in a generally square array above the ground. There were five rows of elements in the array with five elements per row. A lower array with five long, parallel, horizontal wires was positioned underneath, above the ground and perpendicular to the upper array. Two electronics vans were positioned near the center of the array. By August 1968 the antenna was reconfigured; the upper array then consisted of three wider-spaced eight-element rows (Figure 6). The lower array was rearranged into four more widely spaced rows and the vans were repositioned, one near the southern side of the antenna and the other parked outside the antenna limits.

15. Between August and October 1970 the array was again reconfigured into five five-element rows, as shown in Figure 7. A circular structure of undetermined function (Figure 6), present along the northern edge of the array since December 1968, was removed between August and October 1970.

16. The second horizontal array was first observed under construction just west of the first array in August 1968. Four cage dipole antenna elements were observed on the ground in September 1968. Until April 1970 the element supports were observed in various random positions that did not approximate any meaningful antenna pattern.

17. In April 1970 a total of 15 element supports formed a pattern of five rows: two three-element rows; two two-element rows; and a central five-element row. A probable control building is within the area (Figure 8). An array of thin antenna elements was mounted on the supports. Their exact configuration was not discernible, but shadow patterns indicated each element support had a vertical mast with a cage dipole antenna mounted atop it. Each cage dipole antenna . They are probably similar, and may be identical, to cage dipole antennas photographed on ground photography at the Grakovo Radio Astronomy Facility, near Kharkov. The long axis of each cage dipole was aligned along

Possible Water Treatment Plant Under Construction

18. Construction of a new facility began in late June 1970 in a separately secured area immediately north of the northern support facility at R&D Radar Facility 2 (Figure 3). By October 1970 the western part of this area contained three large buildings under construction, two smaller buildings apparently complete, a probable guard shack under construction, a large rectangular excavation, and one probable building foundation under construction. Numerous foundation footings were observed adjacent to two of the buildings that were under construction. Three open trenches were observed between this part of the facility and a possible water intake and pumping facility under construction along the Lake Balkhash shoreline. Large pipe sections which may be used to carry water from a possible offshore intake point were lying along the shoreline. This entire area of activity may be associated with the construction of a water treatment plant.

REFERENCES

MAPS OR CHARTS

ACIC. US Air Target Chart, Series 200, Sheet M0245-15HL, 3d ed, Apr 66, scale 1:200,000 (SECRET/

DOCUMENTS

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2. NPIC. RCA-19/0010/69, *Sary-Shagan Research and Development Radar Facility 2, USSR,* Feb 69 (TOP SECRET CHESS RUFF
3. NPIC. RCA-03/0037/70, *Sary-Shagan Research and Development Radar Facility 2, USSR,* Jan 70 (TOP SECRET CHESS RUFF

REQUIREMENT

NPIC/IEG/MSD/DMB Project 143291NC